

**Clara Thomas Archives and
Special Collections Reproduction Service**

This copy is made for private study / research purposes only and not for reproduction or publication without the consent of the copyright owner.

This copy cannot be transferred to individuals or institutions without the written consent of Clara Thomas Archives and Special Collections, York University.

Call no./ neg. no.

2018-016 / 012 (08) "A Resume Of The

**Biological Warfare Effort" By H.I. Stubblefield
21 MAR. 1958 National Security Archive,
Georgetown University, Washington, DC:
Chemical + Biological Collection**

Endicott fonds, F0667

BEST COPIES POSSIBLE

Record Number 54793

Stubblefield Report
Resume 1958

SET
DOCUMENT TYPE Chemical and Biological Warfare Report
DATE 03/21/1958
CIRCD
TIME
ORIGIN United States. Army. Office of the Chief Chemical Officer
SIGNATOR Stubblefield, H. I.
DESTO
DESTP
CLASSIFICATION Confidential
TITLE A Resumé of the Biological Warfare Effort
CTIT
NAMES Jewett, Frank B.
NAMES Merck, George W.
NAMES Bundy, Harvey H.
NAMES Merck, George W.
TERMS Biological warfare
TERMS Fort Detrick, MD
ORGAN National Academy of Sciences
ORGAN National Academy of Sciences. W. B. C. Committee
ORGAN National Academy of Sciences. A. B. C. Committee
ORGAN United States. Army. Chemical Warfare Service
ORGAN United States. War Department
ORGAN United States. Department of Defense. Office of the Secretary. Joint Research and Development Board
PGS 32

896 58-8
Control No. _____

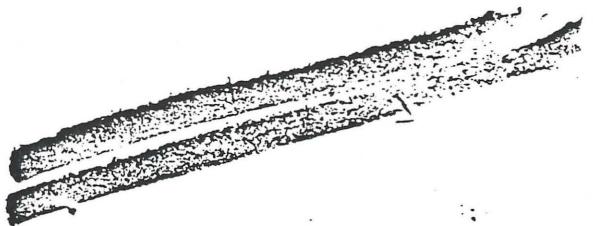
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF CHEMICAL OFFICER
Washington 25, D. C.

A RESUME OF THE BIOLOGICAL WARFARE EFFORT

b7

H. I. STUBELKJERG, M.D.
Bd Assistant to Deputy
Chief Chemical Officer
for Scientific Activities

21 March 1958



45
No. 3 of 3 Copies, Series 6



ENGRAVING DATA CANNOT
NOT BE DETERMINED

26016 (88)



SECTION I

STATUS OF BW BEFORE WWII

1. In the years between WWI and WWII interest was shown among scientists and military men of many countries in the general subject of BW. Many of the views and opinions appearing in print between 1918 and 1941 were based upon incontrovertible evidence that German agents in U. S. in 1915 used cultures of bacteria to inoculate horses and cattle being shipped to the Allies, and that German agents attempted to infect cavalry horses of the Romanian Army with glanders during WWI.

2. Edgewood Arsenal Mechanical Division Report 442, dated 24 Sept. 1924, recommended that the CGS make a study of potentialities of BW. The Chief, CGS, in his Annual Report of 1926 stated that little promise was held for this form of warfare. An article, "Bacterial Warfare - The Use of Biological Agents in Warfare," by Maj. (later Brig. Gen.) L. A. Fox, MC, attached to CGS, was published in "The Military Surgeon," March 1933. The author concluded to consider that it is highly questionable if biologic agents are suitable for warfare. Technical Study No. 10, 28 Aug. 1939, by Maj. (later Col.) J. W. Johnson, CGS, indicated a change in attitude toward BW. Nine diseases (colic, diarrhea, the dysenteries, cholera, typhus, bubonic plague, smallpox, influenza, sleeping sickness, and tetanus) were suggested as possible agents.

3. Several agencies of our government considered the subject of BW independently. A group of scientists met at the National Institute of Health of the U. S. Public Health Service, also members of the Council of National Defense, the National Research Council, officers of the staffs of the Surgeons General of Army and Navy, 52 of the Army, and a small group of officers in the CGS - all discussed the possibility and feasibility of BW especially with respect to becoming a menace to the U. S.

4. In July 1941, Mr. Harvey H. Bundy, Special Assistant to the Secretary of War, called a meeting of representatives from Office of the Surgeon General, CGS, AC/S 32, and Committee on Medical Research of Office Scientific Research and Development, to determine means by which the military services might most effectively coordinate their efforts in problems of BW. The committee reported to the Advisory Council of Office Scientific Research and Development which recommended to the Secretary of War that the National Academy of Sciences investigate the possibilities of BW.

5. In October 1941, upon request of the Secretary of War, the President of the National Academy of Sciences and the Chairman of the National Research Council asked Dr. E. B. Fred (President, Univ. of Wis.) to serve as Chairman, and help form a committee, later designated the C&BC (Committee for Biological Warfare.) Its purpose was to consider those BW agents that may be used to produce harmful effects on man, animals, and plants, and methods of control of these agents; or in terms of war, a study of offensive and defensive BW.

SECTION I

STATUS OF BW BEFORE WWII

1. Interest in BW potential was stimulated by German covert BW actions in WWI. (Para. 1, pg 2)
2. Mechanical Division, Edgewood Arsenal Report No. 442, 24 Sept. 1924, recommended that CWS investigate BW potentials. Chief of CWS, in his Annual Report of 1926, held little promise for BW. Maj. (later Brig. Gen.) L. A. Fox, MC, attached to CWS, stated in March 1933 that BW was of questionable value, but CWS Technical Study No. 10, 28 Aug. 1939, suggested nine diseases as of possible BW threat. (Para. 2, pg 2)
3. From 1939 to 1941 many government agencies reviewed BW potential - the consensus being that BW is feasible and possible, and is a potential threat to U. S. This led to formation in Oct. 1941 of NBC (Committee on BW) to study the problem and report findings and recommendations to the Secretary of War thru National Academy of Sciences. (Paras. 3-5, pgs 2&3)

Officers of OSJ, with the WBC, compiled an annotated bibliography of some 200 articles on BW published up to that time. The authors of the bibliography stated, "An analysis of the opinions expressed by the authors of articles under consideration reveals that the great majority believe that BW is possible or probable in the future."

SECTION II
EARLY WWII BW ACTIVITIES

1. In February 1942 on advice of NBC Committee (Committee for Biological Warfare), the Secretary of War, through General Staff to the President, recommended that offensive and defensive measures be taken. On 15 May 1942 the President verbally approved BW research and development under a civilian agency. The "War Research Service," organized in the Federal Security Agency, with Mr. George W. Merck as Chairman, was put in control of all phases of BW, reporting to Secretary of War through a Special Assistant, Mr. Harvey H. Bundy. (Paras. 1-4, pg 5)

2. The War Research Service, aided by competent advisors, selected critical areas for research under contracts in various federal and non-federal laboratories funded from the President's Emergency Fund. (Paras. 5&6)

SECTION II

EARLY WWII BW ACTIVITIES

1. The WBC Committee (Committee for Biological Warfare) reported in Feb. 1942 to the Secretary of War through Dr. Frank B. Jewett, President of the National Academy of Sciences, that BW is regarded as distinctly feasible and that steps should be taken to formulate offensive and defensive measures.
2. The Secretary of War referred the WBC report to the General Staff and the President. The General Staff recommended that the BW efforts be placed under a civilian agency. On 15 May 1942 the President gave verbal approval to undertaking BW research and development. The "War Research Service" was organized in the Federal Security Agency, under chairmanship of Mr. George W. Merck, who was put in full control of all aspects of BW. The War Research Service was set up as a small group with Dr. E. B. Fred as Director of Research and Development, and Mr. John P. Marquard as Director of Intelligence. A small staff of technical aides and secretaries carry on administrative work of War Research Service. WRS was under direction of the Secretary of War, represented by a Special Assistant, Mr. Harvey H. Bundy. It was decided that all work on BW should be under the strictest security control. Liaison was established with and cooperation on special problems was requested from Bureau of Medicine of the Army, Office of Chief Chemical Warfare Service, Surgeon General of Army, United States Public Health Service, United States Department of Agriculture, G2 of Army, Office of Naval Intelligence, OSS, FBI, Bureau of Public Relations, War Department Director of Office of War Information, and Office of Censorship. Defensive measures were established in the Service Commands through the Internal Security Division of the Office of the Provost Marshal General.
3. Cooperative arrangements were set up with Canada and UK whereby information and personnel were exchanged. Groups of U. S. scientists were exchanged with UK and Canada; some in supervisory capacities, and others for actual laboratory research. A joint United States-Canadian Commission was appointed to study animal disease at a Canadian laboratory, Grosse Ile, in the St. Lawrence River. The commission studied rinderpest and developed a vaccine for the disease, which in trials in rinderpest infected areas, proved highly efficient. Outstanding specialists from both countries participated.
4. An all-incompetent advisory group, the ABC Committee, was organized by the National Academy of Sciences and National Research Council to advise War Research Service on technical matters. Its members were leaders in their various fields.
5. It was the responsibility of War Research Service to organize an entirely unknown field of research and development, since most aspects of BW

were purely theoretical. Rather than establish a large independent agency with its own laboratories and facilities, it was decided to request use of personnel and experience in existing government and other institutions. Funding was from the President's Emergency Fund. Scientists who were recognized as leaders in their respective fields examined, in consultation with W&J, a long list of pathogens to determine those which might be used by the enemy. Finally a research project leader for each proposed agent was selected, and laboratories in various universities and research institutions throughout the country were solicited to study disease-producing properties, means for production, and methods of protection. The first two agents to receive critical attention were anthrax and botulism toxin because the British had done much work on them before U. S. entered WWII. They could be produced in sufficient quantity for retaliatory use in a minimum time. (The British had prepared several thousand "tablets" of bran molasses, cracked grain, etc. with a center of anthrax spores, to be used to infect cattle in enemy areas.) As laboratory studies of some agents began to indicate potentiality for BW use, it was necessary to plan beyond the laboratory stage toward pilot plant, large scale production, and field test phases of investigation. ←

SECTION III

COMMITTEES ON BIOLOGICAL WARFARE AND PERSONNEL

Personnel Associated with Early Activities Leading to the Establishment of the WBC Committee

The Secretary of War, the Honorable Henry L. Stimson
Barker, Lt. Col. M. C., Chief, Tech, Div., CWS
Bundy, H. H., Special Asst. to Sec. War
Bush, V., Director, OSRD
Defendorf, James H., Lt. Col., CWS
Dix, Howard W., Lt. Col., Sec. War's Liaison to NDBC
Harrison, Ross G., Chairman, NRC
Jacobe, R. C., Lt. Col., CSC
Jewett, Frank B., President, NAS
Miles, S., Brig. Gen., ACofS, C-2
Parran, Thomas, S. G. USPHS
Richard, A. M., Chairman, CCR, OSRD
Simmons, James S., Col., SGO, USA
Weed, Lewis H., Chairman, Div. of Medical Sciences, NRC

The WBC Committee of the National Academy of Sciences and Liaison

Fred, Edwin B., Dean, Graduate School, Univ. of Wisconsin, Chairman
Harrison, Ross G., Ex. officio, Chairman, NRC
Jewett, Frank B., Ex. officio, President, NAS
Weed, Lewis H., Ex. officio, Chairman, Div. of Med. Sciences, NRC
Bayne-Jones, Stanhope, Yale University School of Medicine
Clark, W. Mansfield, School of Medicine, Johns Hopkins University
Hagan, William A., Veterinary College, Cornell University
Tunkel, Louis O., Rockefeller Institute
Rivers, Thomas M., Rockefeller Institute Hospital
Sherman, James M., College of Agriculture, Cornell University
Talisferro, William H., University of Chicago
Turner, Thomas B., School of Hygiene, Johns Hopkins University

WBC Committees

Black, E. G., B. S. Dept. of Agriculture
Barker, L. L., Lt. Col., CWS
Barker, James H., Lt. Col., CWS
Barker, Howard W., Lt. Col. Ord.
Dyer, R. E. Director, Nat'l Institute of Health, USPHS
Kelsner, Raymond A., Col., VC, SGO, USA
Noy, Luman F., 1st Lt., CSC, USA
Simmons, James S., Col., MC, SGO, USA
Stephenson, C. S., Capt., MC, USN, BuMHS
Shayne, T. B., Lt. Col., MC, SGO, USA

Dr. R. McIntosh, Federal Security Agency, the Honorable Paul V. McNutt
Gen. George C., Director, WRS
Fred, Edwin B., Dir., Research and Development, WRS
Marquand, John P., Dir., Intelligence & Information, WRS
Switzer, Mary E., Asst. to the Admin., FSA, in chg Contracts & Finances
Bohrman, A. S., Lt. Col., Sn.C., In chg, A.B.W. work
Thompson, A. T., Lt. Col., VC, Tech. Aide & Executive Off. until 1 Jan 44
Sarles, William B., Lt. Comdr., USNR, Tech. Aide & Executive Off fr 1 Jan 44.

ABC Committee and Liaison Members

Clark, W. Mansfield, Johns Hopkins University, Chairman
Harrison, Ross G., Ex officio, Chairman, NRC
Jewett, Frank B., Ex officio, President, NAS
Adams, Roger, University of Illinois
Dochez, Alphonse R., Columbia University
Feldman, William H., Mayo Foundation
Goodpasture, Ernest W., Vanderbilt University
Kraus, E. J., University of Chicago
Pepper, O. H. Perry, University Hospital, University of Pa.
Winternitz, Milton C., Yale University

Liaison Officers

Auchter, Eugene C., U. S. Dept. of Agriculture
Baldwin, Ira L., WRS and CWS
Chittick, Martin B., Col., CWS, USA
Dyer, Rolla E., U. S. Public Health Service
Potthegill, L. D., Comdr., MC, USNR
Fred, Edwin B., Director, Research & Development, WRS
Kelsner, Raymond A., Brig. Gen., VC, USA
Merck, George W., Director, WRS
Sarles, William B., Lt. Comdr., USNR, Executive Officer, WRS
Simmons, James S., Brig. Gen., MC, USA

ABC Committee and Liaison Members

Jewett, Frank B., President, NAS
Harrison, Ross G., Chairman, NRC
Pepper, O. H. Perry, University Hospital, Univ of Pa., Chairman
Clark, W. Mansfield, Johns Hopkins University, Vice-Chairman
Adams, Roger, University of Illinois
Armstrong, Charles, U. S. Public Health Service
Dochez, Alphonse R., College of Physicians & Surgeons, NYC

USBW Committee and Liaison Members (cont'd)

Berry, John E., Nat'l Institute of Health, USPHS
Belcher, William E., Mayo Foundation
Brooks, Merrill W., University of Wisconsin
Goodpasture, Ernest W., Vanderbilt University
Hagan, William A., Veterinary College, Cornell University
Kraus, E. J., University of Chicago
Martin, William H., Rutgers University
Mueller, J. Howard, Harvard Medical School
Schoening, H. W., U. S. Dept. of Agriculture
Winternitz, Milton C., Yale University
Sarles, William B., Comdr., USNR, Secretary

Liaison Officers

Baldwin, Ira L., University of Wisconsin
Pothergill, L. D., Capt. USNR, SPD, CHS
Hudson, W. Paul, SDO
Kelsner, Raymond A., Brig. Gen. VC, SDO, USA
Morgan, Hugh J., Brig. Gen., SDO
Simmons, James S., Brig. Gen., Prov. Med. Serv., SDO, USA
Turner, Thomas B., Col, Prov. Med. Serv., SDO, USA
Woolpert, Oran C., Col., Tech. Officer, Camp Detrick

USBW Committee and Liaison Members

Kerck, George W., Chairman, Consultant to Sec. War
Borden, William A., Brig. Gen., New Developments Div., WDSS
Donovan, William J., Major Gen., Director, OSS
Hussey, George F., Rear Adm., Bureau of Ordnance, USN
Kirk, Normal T., Major Gen., Surgeon General, USA
Lutes, LeRoy, Lt. Gen., Chief of Staff, ASF
McIntire, Ross T., Vice Adm., Surgeon General, USN
Norstad, Lauris, Major Gen., Asst. Chief of Air Staff, Plans
Peabody, Paul E., Brig. Gen., Chief, MIS
Porter, William H., Major Gen., Chemical Warfare Service
Maldrom, Albert W., Major Gen., Requirements Section, AGF

Liaison Officers

Talbot, Harry, Lt. Col., British Army Staff, S. D. Branch
Keller, Otto, Maj., Dept. of Chem. Warfare & Smoke, Canada

Staff

Sarles, William B., Comdr, USNR, Technical Aide
Hodge, William H., Capt. AUS, Secretary (until 1 April 1945)
Arneson, R. Gordon, 1st Lt., AUS, Sect. (after 1 April 1945)

SECTION IV

ONE ACTIVITIES IN BW RESEARCH AND DEVELOPMENT IN WWII

1. Extension of laboratory studies to pilot plant, production, field testing and munition design required military security and facilities. In Nov. 1942, CGS was directed to undertake such problems as assigned by WES. (Para. 1, pg 12)

2. Camp Detrick, Frederick, Maryland, was selected as site for laboratory, pilot plant and munition development facilities. WES contracts were assigned to the CGS. Modifications of buildings and construction of new facilities started in April 1943. Research and development progressed rapidly on problems assigned by WES, under the Chief, Medical Div., CGS. (Para. 2, pg 12)

3. In Jan. 1944 the Secretary of War directed the War Department to assume responsibility for all Intelligence and defensive measures in BW. This required program required that Chief, Med. Div., CGS, be relieved of BW responsibilities which were charged to a "Special Projects Division" established for this purpose on 18 Jan. 1944. Finally on 18 June 1944, full responsibility for all research and development and other functions of WES were assigned to CGS (Special Projects Div.). (Para. 3, pg 12, para 4, pg 13)

4. Research and Development projects at Camp Detrick were organized in April 1943 for each agent in four phases - Laboratory, Pilot Plant, Development & Testing of Munitions, and Protective Devices & Measures. Added projects and tasks required organization of 9 operational divisions under a Technical Director and Staff: Animal Research (A), Crops (C), Munitions (M), Basic Sciences (BS), Biological Defense (B), Physical and Chemical Defense (PC), Biological Safety (S), Engineering Research and Service (E), and Administration Div. At peak of operations (Aug 1945) 2273 people were employed, (Army, Navy and Civilians). Construction, Maintenance & Operations, and R&D Costs from April 1943 to Nov. 1945: \$14,914,358. (Paras. 5&6, pg 13, para. 7, pgs 13&14, para 8, pg 14, para. 9, pgs 14&15)

5. Pursuant to directive, a full scale production plant for botulinum toxin and anthrax was built at Vigo Ordnance Plant (Terre Haute, Ind.). Existing buildings were converted and new facilities constructed. Site is indicated for future 1,000 gal. production tanks and associated facilities. Plant was "seeded" tested and operating personnel trained by producing a simulant, which was also used to test equipment and train personnel for bomb filling. In August 1945, Army, Navy, and civilian personnel totaled 1495. May 1943 to Nov. 1945, Construction and Manufacturing Costs: \$8,837,864. (Para. 10, pg 15, para. 11, pgs 15&16)

6. Two Field Test Sites were acquired:

Horn Island, in the Gulf Coast off Pascagoula, Miss., for semitropical tests of agents and munitions, acquired on 24 March 1943. Meteorologic, terrain,

and adjacent strip lanes limited scope of testing. Some 25 tests were run. Personnel (Army & Navy) in August 1945 were 123; Construction Costs: \$346,179. (Para. 12a, pg 16)

Granite Peak, 250 sq mi in Salt Lake Desert, near Dugway Proving Ground was used for munitions tests, aerosol cloud production and performance, sampling devices, ballistics, etc. Much valuable data were acquired. Personnel in August 1945 were (Army & Navy) 158. Costs for Construction and R&D were \$1,376,000. (Para. 12b, pgs 16&17)

SECTION IV

CWS ACTIVITIES IN BW RESEARCH AND DEVELOPMENT IN WWII

1. It was decided that large scale production development, munitions design, field testing, and protective measures should proceed with all possible haste and with maximum security under military protection. Accordingly in November of 1942, the Chemical Warfare Service was directed to participate actively in the expanding program of research and development, and to undertake specific problems as assigned by WRS. The War Research Service designated Dr. I. L. Baldwin of University of Wisconsin as Scientific Advisor to the Chemical Warfare Service to direct the technical aspects in the field and to coordinate the work with War Research Service. The BW planning within the CWS was done in a "Medical Research Division", later changed to "Special Assignments Branch" at Edgewood Arsenal, Md. In July 1943 the program was assigned to the newly organized "Medical Division" of CWS. The expanded program necessitated acquisition of laboratory, pilot plant, munitions design, field testing and supporting facilities which were too extensive to be located at Edgewood Arsenal.

2. The National Guard Airport, Detrick Field at Frederick, Md. was selected as the site for laboratory and pilot plant facilities. Construction of suitable buildings, support units and conversion of existing structures was started in early April 1943. Research and development activities at Camp Detrick, which were assigned by WRS, were the direct responsibility of the CWS, but the general program was continued under guidance of War Research Service. As research projects were developed in university or other laboratories under WRS sponsorship, they were turned over to CWS. Many WRS contracts for research were transferred to CWS. As the program progressed, responsibility shifted from civilian to military organizations. Personnel were assigned from the Navy and Army, especially from the Offices of the Surgeons General, so that the program, under immediate direction of CWS, was a combined operation. Many of the people who were consultants or had worked on War Research Service contracts were transferred to CWS either as full time civilians, or part-time consultants, or were commissioned in Army or Navy. The Chief of CWS was given a high priority for selection of military personnel who had suitable training. Officers were secured from Ordnance, Engineers, Signal Corps, Artillery, Infantry, etc.

3. In mid-December 1943 Intelligence sources had received information indicating possible plans by the Germans to use their cross-channel weapons to carry V-1's into the British Isles. War Research Service requested CWS and Office of the Surgeon General to accelerate work on protective measures for our troops. On Jan. 15, 1944 the Secretary of War directed the War Department to assume full responsibility for collection, evaluation, and dissemination of intelligence on BW, and for defensive measures against BW. Continued cooperation of the Navy was invited. The program in BW was thus expanded to a degree that rendered direction by the Chief, Medical Division, impractical in addition to his other responsibilities.

On 18 Jan. 1944 the "Special Projects Division" was established within the Bureau to coordinate and supervise the expanding BW research and development program, thus relieving the Chief, Medical Div., OCCW&S of these BW responsibilities.

5. Functions of the Special Projects Division were to:

- a. Develop measures and plans for BW defense and retaliatory offensive use through research and development;
- b. Be responsible for production or procurement of all material for adequate defense and offense;
- c. Plan and supervise laboratories, pilot plants, proving grounds and manufacturing establishments;
- d. Collect and evaluate intelligence on enemy BW activities;
- e. Maintain liaison with military and civilian organizations and with like units of allied governments;
- f. Develop doctrine, prepare training publications, conduct instruction in both offense and defense; and
- g. Supply technical advice to the Armed Forces.

6. On 18 June 1944 the President directed the War Department to assume full responsibility for all research and development, and for functions previously performed by War Research Service. Mr. George W. Merck, the Director of War Research Service, was appointed Special Consultant on BW to the Secretary of War. Several of the staff of War Research Service remained as consultants with Mr. Merck.

7. Four groups of projects were outlined for Camp Detrick Operations Division representing the branches of the Division: Laboratory L, Pilot Plant P, Munitions M, Defensive developments D.

Initial Project Specifications were as follows, April 1943:

CD-L-1 Laboratory development of botulinum toxin as a BW agent
1 Laboratory development of anthrax as a BW agent
2 Laboratory development of simulated BW agents

CD-P-1 Pilot plant development of botulinum toxin as a BW agent
2 Pilot plant development of anthrax as a BW agent
3 Pilot plant development of simulated BW agents

CD-M-1 Development and testing of munitions, weapons, and offensive techniques for the use of botulinum toxin as a BW agent

CD-4-2 Development and testing of munitions, weapons, and offensive techniques for the use of anthrax as a BW agent

3 Development and testing of munitions, weapons, and offensive techniques for the use of simulated BW agents

CD-5-1 Development of protective devices and measures against botulism

2 Development of protective devices and measures against anthrax toxin

3 Development of protective devices and measures against simulated BW agents

4 Protective devices which may be completely sterilized and keep their effectiveness

8. In August 1943 two projects were added to each branch: Rice fungus as BW agents; arthropods for destruction of food crops. Soon thereafter the following agents were added: dysentery, ricin, Southern Blight, rice blast, late blast, brown spot of rice, plant growth inhibitors, rinderpest, glanders, and typhus. No work was done on typhus and dysentery. Ricin was studied by the Medical Div. at Edgewood. Rinderpest was a joint Canadian-U.S. project at Gross Is.

9. As the number of agents to be investigated grew, project specifications became less inclusive and were broken down into more detail. New studies included selection of strains, mutation, study of pathogenesis, improvement of media, techniques of separation of agent from media, stability factors, use of agents, physical state and form of agents, adaptation of laboratory procedures to pilot plant production, development of safety measures and decontamination procedures, separation, concentration and drying of agents, packing and storage methods, development of test methods, procedures for routine process control. The increase in tasks and projects necessitated reorganization into nine operational divisions, under a Technical Director and his staff. In addition to normal housekeeping and military administrative sections these nine research and development divisions were: Animal Research (A), Crops Research (C), Munitions (M), Basic Sciences (BS), Biological Defense (B), Physical and Chemical Defense (PC), Biological Safety (S), Engineering Research and Service (E), and Administrative Div.

PERSONNEL AT CAMP DETRICK (AUG 1945)

Army - Officer	245
Enlisted	1457
Navy - Officer	87
Enlisted	475
Civilian	9
Total	2273

The largest number of personnel in the Special Projects Division, 245, was during mid-August 1945:

Army	2872
Navy	968
Civilian	206
Total	4046

Costs of BW Facilities and Operations to CWS (Special Projects Division) April 1943 through November 1945 (exclusive of funds from Service Commands or other agencies of the War Department which provided funds or special facilities of their own).

CAMP DETRICK

Construction	\$12,151,348.
Maint & Oper.	189,676.
Res. & Dev.	<u>2,573,334.</u>
TOTAL	\$14,914,358.

10. A full-scale production plant for botulinum toxin and anthrax was built at the site of an Ordnance plant at Vigo, a suburb of Terre Haute, Ind., which was acquired in May 1944. As much of the existing plant as possible was converted and rebuilt. New facilities built included a theater, 85 bed hospital, shops, boiler houses, engine houses and special production facilities, laboratories, refrigerator plants, twelve 20,000 gal. production tanks, separators, concentration equipment, bomb filling, fuse assembly, and detonator loading buildings. The plant was staffed, personnel trained for operation, and the plant proofed by producing a simulant (bacillus globigii).

11. One million 4 lb, light case, explosive type, air-arming, contact fuse bombs, to contain 320 ml of agent were under procurement with delivery of 125,000 per month beginning March 1945. Half of the bombs were to be filled with simulant and used for field trials and for training of loading and fusing crews. The other half were to be stockpiled for use by the British. Infectious agents were not produced in the Vigo plant; the Vigo plant was used to produce only simulant agent for proofing the plant and training of personnel in plant operation and bomb filling.

PERSONNEL AT VIGO PLANT (MAY 1945)

Army - Officer	124
Enlisted	843
Navy - Officer	32
Enlisted	294
Civilian	202
TOTAL	1495

Costs of BW Facilities and Operations to CWS (Special Projects Division) April 1943 through November 1945:

V100 PLANT

Construction	\$7,880,838.
Manufacturing	956,967.
Mount & Oper.	59.
TOTAL	\$8,837,864.

(M&O from Service Cards
& Camp Detrick)

12. FIELD TEST SITES

a. HORN ISLAND, ten miles south of Pascagoula and Biloxi, Miss., in Mississippi Sound, off the northern coast of the Gulf of Mexico, was acquired for CWS on 24 March 1943. Construction of test facilities was begun on 16 June 1943. It was found that numerous craft were plying the intercoastal waterway due to a recent recession of restrictions on vessel movement. Unrestricted munitions trials and bacterial agent tests were too hazardous, hence use of the site was limited to testing two toxins, botulinum and ricin. An ~~experimental~~ branch was organized to study fly and mosquito population, and their potential use as vectors. Meteorologic records show that for two-thirds of the year winds over the island were toward the mainland and unfavorable for trials with NBC agents. Tidal conditions were such that considerable areas were under water at high tide. The sandy wet soil permitted few hard surface roads, ~~or~~ ~~and~~ railroads were used for transportation.

Between 28 Oct. 1943 and 13 Aug. 1945, 23 trials were conducted with botulinum toxin, principally filled in the 4 lb bomb; one trial with R77 smoke bomb. Some data were obtained on effect of the toxin on experimental animals and on effects of botulinum toxoid administered to test personnel. Little useful data other than negative experience were gained at Horn Island.

PERSONNEL AT HORN ISLAND (AUG 1945)

Army - Officer	12
Enlisted	38
Mavy - Officer	4
Enlisted	19
TOTAL	123

Costs of BW Facilities and Operations to C&S (Special Projects Division) April 1943 through November 1945:

HORN ISLAND

Construction	\$346,179.
--------------	------------

(M&O & R&D from
Camp Detrick)

b. GRANITE PEAK INSTALLATION was the principal BW test site; an area of 250 sq. miles, about 35 miles from the headquarters of Dugway Proving Ground.

construction was started 10 July 1944 and completed 30 Jan 1945. It was used to test munitions (using simulant agents). Aerosol cloud production and performance over a wide range of meteorological conditions were studied. Sampling devices and methods for testing particulates in clouds, including exposure of test animals were perfected. Ballistic performance of munitions both statically fired and from aircraft drops were studied.

The experience gained at Granite Peak was of inestimable value to future activities in the munitions development and testing programs.

GRANITE PEAK COSTS

Construction	\$1,343,334.
R&D	<u>32,765.</u>
TOTAL	\$1,376,119.

(100 from Camp Detrick
and Banning Training
Ground)

PERSONNEL AT GRANITE PEAK (AUG 1945)

Army - Officer	10
Enlisted	88
Navy - Officer	4
Enlisted	56
TOTAL	158

TOTAL COSTS of BW Facilities and Operations to CWS (Special Projects Division) April 1943 through November 1945 (exclusive of funds from Service Commands or other agencies of the War Department which provided funds or special facilities of their own) amounted to: \$ 25,479,520.

Contracts with Universities and research institutions including those assumed from WRS 1 Sep 1944 to Mar 1945: \$1,087,865.

Funds used by WRS were from the President's Emergency Fund and were used for contracts, salaries, and administrative costs.

SECTION V

BW PROBLEMS ASSIGNED TO
OFFICE OF CHEMICAL WARFARE SERVICE (SPECIAL PROJECTS DIVISION)
BY WAR RESEARCH SERVICE

By the following directives, WRS to CWS, Subject: "Request for Supplemental Research and Development," CWS was directed to:

1. Develop ways and means for disseminating agents simulating those which may be used in BW. (Mem Dir., 10 Dec. 1942)
2. Develop ways and means for effective dispersal of agents destructive to animal life. (Mem Dir., 10 Dec. 1942)
3. Determine effective design, size, and tactical use of a device for dispersal of anthrax (B) organisms when dropped from aircraft. (10 Dec. 1942)
4. Provide necessary facilities for large scale production of anthrax and botulism toxin, to investigate and develop military dissemination of these materials, and to develop protective measures against them. (31 Mar 1943)
5. Conduct investigation of two crop diseases; late blight of potatoes and sclerotium rolfsii (Southern blight of grains, potatoes, and sugar beets). (Ltr., Dir., 29 Oct 1943)
6. Conduct investigation of tularemia (rabbit fever) and brucellosis (undulant fever) (human diseases); diseases of rice, and plant growth regulating substances. (Ltr Dir., 17 Mar 1944)
7. Conduct investigation of glanders and melioidosis (pseudo glanders). (Ltr Dir., 5 May 1944)
8. Assume responsibility for all BW research and development, including several WRS contracts with university and research institutes. (Ltr Dir., 9 Jun 1944). (One exception was the study of plague by the Naval Medical Research Unit No. 1 at Berkeley, California.)

~~SECTION 1~~
CONTRACTS SET UP BY WRS BUT TERMINATED PRIOR TO 1 SEP 1944:

Dr. William A. Nagan S. I. Banta Veterinary College Cornell University (trfd to CWS 31 Mar 43)	Anthrax	\$2,762.54 (1 Jan 43-30 Jun 44)
Dr. J. Edward Mueller Dept. of Bacteriology Harvard Medical School (trfd to CWS 31 Mar 43)	Botulism	3,886.17 (1 Dec 42-30 Jun 44)
Dr. Rene J. Dubos Dept. of Tropical Medicine Harvard Medical School (trfd to CWS 1 Jul 44)	Dysentery	6,937.33 (1 May 43-30 Jun 44)
Dr. Perry W. Wilson Dept. of Bacteriology University of Wisconsin (trfd to CWS 30 Jun 44)	Mass culture of spores	698.84 (1 Jul 43-30 Jun 44)
Dr. Louis A. Julianelle Division of Infectious Diseases Pub. Health Res. Inst. of N.Y. (trfd to CWS 1 Jul 44)	Anthrax immunization	10,369.82 (1 Jul 43-31 Dec 43)
Dr. Freeman A. Weiss Bureau of Plant Industry, USDA Beltsville, Md. (trfd to CWS 1 Jul 44)	Sclerotium rot	8,164.75 (6 Feb 43-30 Jun 44)
Dr. Reiner Bonds Maine Agro. Exper. Station University of Maine (trfd to CWS 29 Oct 43)	Late blight	1,475.51 (15 Feb 43-30 Oct 43)
Dr. I. Forrest Huddleston Central Brucella Station Michigan State College	Brucellosis	2,484.43 (1 Jan 43-30 Jun 43)
Dr. William H. Martin New Jersey Experimental Station Rutgers University	Late blight	216.54 (1 May 43-30 Nov 43)
Miss Elizabeth McCoy Dept. of Bacteriology University of Wisconsin	Botulism	1,940.58 (1 Jan 43-31 Dec 43)
Dr. Charles E. Foster U.S. Public Health Service	Survey of water supply systems of primary military importance	3,066.82 (1 Apr 43-31 May 43)

SECTION VII

CONTRACTS SET UP BY WBS AND TRANSFERRED TO CWS ON 1 JUL 1944:

Dr. Lee Poston
Dept. of Bacteriology
University of Cincinnati

Dr. Byron Reigel
Dept. of Chemistry
Northwestern University

Dr. Hermann Sommer
Geo. Williams Hooper Foundation
University of California

Dr. Core M. Doms
Dept. of Bacteriology
University of Kansas

Dr. E. C. Tallis
Bureau of Plant Industry, USDA
Beaumont, Texas

Dr. Melvin S. Newman
Dept. of Chemistry
Ohio State University

Capt. Arthur R. Lack, MC, USA
Stanford University School
of Medicine

Dr. James A. Reyniers
Laboratories of Bacteriology
University of Notre Dame

Dr. Forrest E. Kendall
Columbia General Hospital
Welfare Island, New York
and

Dr. Michael Heidelberger
College of Physicians and Surgeons
Columbia University

Tularemia \$5,109.87
(1 Oct 43-31 Aug 44)
9,600.00
(1 Sep 44-30 Jun 45)

Mussel poisoning 7,528.53
(1 Mar 43-31 Aug 44)
10,000.00
(1 Sep 44-30 Jun 45)

Mussel poisoning 668.93
(1 Mar 44-31 Aug 44)
3,000.00
(1 Sep 44-30 Jun 45)

Tularemia 2,774.62
(1 Mar 44-31 Aug 44)
(1 Sep 44-30 Jun 45)

Rice diseases 2,661.66
(1 Oct 43-31 Aug 44)
(1 Sep 44-30 Jun 45)

Plant growth 3,741.86
regulators (1 May 44-31 Aug 44)
9,000.00
(1 Sep 44-30 Jun 45)

Coccidioidomycosis 10,951.88
(1 Jul 43-31 Aug 44)
14,000.00
(1 Sep 44-30 Jun 45)

Preservation 26,841.58
of rickettsia (1 Jan 43-31 Aug 44)
9,000.00
(1 Sep 44-30 Jun 45)

Anthrax 9,760.20
immunization (1 Mar 43-30 Jun 44)
16,000.00
(1 Jul 44-30 Jun 45)

CONTRACTS SET UP BY CWS AND TRANSFERRED TO CWS ON 1 JUL 1944 (cont'd):

Dr. E. J. Smith
University of California

Plant growth regulators	3,500.00
	(1 Dec 42-31 Mar 43)
	3,936.50
	(16 Feb 44-30 Jun 44)
	3,000.00
	(1 Jul 44-30 Jun 45)

SECTION VIII

INDEPENDENT STUDIES IN WHICH CWS WAS INTERESTED:

Dr. E. C. Auker
Agriculture Research Administration
U.S. Department of Agriculture

Pest prevention
plant disease control

Dr. Rolla E. Dyer
National Institute of Health
USPHS, Bethesda, Md.

Blood studies

Dr. J. J. Griffiths
National Institute of Health
USPHS, Bethesda, Md.

Cholera

Dr. H. W. Shoening
Bureau of Animal Industry
U.S. Department of Agriculture
(for Joint NBS-USDA Committee)

Foot and mouth disease

Comdr. R. E. Shope, USNR
Rockefeller Institute
Princeton, N.J.

Rinderpest

(for Disease Control Station, Quebec, Canada)

Dr. L. S. Soper
National Institute of Health

Typhus fever

SECTION II

WII ACCOMPLISHMENTS

1. The design and construction of pilot plants and of a large scale production plant for highly pathogenic agents, on a scale never before attempted.
2. The development of methods for mass production and processing of virulent anthrax spores and of organisms causing brucellosis for bomb filling.
3. The adaptation of the British-designed Mark I LO-HK (Light Case High Explosive) 4 pound bomb for the dispersal of anthrax spores and brucella organisms, and modification of existing design to fit American machine practice, and production of a cluster adapter and container for this modification.
4. The development and field testing of a new type of bomb, which held promise of being more efficient for the dispersal of biological agents than the British Mark I 4 pound bomb. (The SS bomb, which was put into the E61 "hour glass" was later discarded in favor of more efficient modifications.)
5. The devising of methods for the field testing of biological materials.
6. The development of methods for pilot plant and large scale production of biological agents pathogenic to rice and other crops. Methods for large-scale use of chemicals to destroy crops. New chemicals which are nonpoisonous to man and animals were discovered and their effectiveness thoroughly proven in extensive field trials. Over 2000 such compounds were synthesized and screened.
7. Methods were perfected for the defoliation of forest and jungle areas using easily available chemicals which are nonpoisonous to man and animals.
8. Contributions were made in studies of the pathogenesis of micro-organisms, particularly with respect to air-borne infectious agents.
9. Procedures for the safe handling of highly pathogenic micro-organisms in laboratory, pilot plant, and production plant were developed. Camp Detrick personnel were and are being consulted by those designing laboratories and plants throughout the country so that improved laboratory and production methods which were developed could be put into more general use. Some of the more improved methods of air conditioning and ventilation, safe disposal, safety laboratory hoods, safe clothing for laboratory personnel, safe design in piping, valving, and plant procedures, improved decontamination techniques, and safe methods of handling infectious materials.
10. Effective toxoids for the immunization of man and animals against type A and type B botulinum toxins were developed and produced prior to the invasion of the Normandy Peninsula.

11. Advances have been made in the study of immunity to anthrax, tularemia, and brucellosis, and in producing immunizing agents against those pathogens.

12. Advances have been made in the therapy of infectious diseases which might be used in biological warfare. For example, the treatment of anthrax with penicillin, of tularemia with streptomycin, and of glanders with sulfadiazine.

Accomplishments of the biological warfare program which possessed special values for peacetime research and development and which were reported in open literature included:

1. For the first time in history of microbiology a bacterial toxin (botulinus toxin) was isolated in pure crystalline form. Two different methods were perfected.
2. Fundamental studies regarding nutrition and conditions of growth of micro-organisms, and safe procedures for their quantity production.
3. Methods for detection of small numbers of micro-organisms.
4. Contributions to the knowledge of control of air-borne disease.
5. Significant additions to knowledge of the development of immunity against certain infectious diseases of humans and animals, and mechanisms of host-parasite relationship.
6. Important improvements in the treatment of certain infectious diseases of humans and animals.
7. Special photographic techniques applied to the study of air-borne micro-organisms, promoting the development of safe laboratory techniques for handling pathogenic organisms.
8. Information secured on the effectiveness of over 1,000 different chemical agents on living plants, which will be of great value to agriculture in control of weeds.
9. Studies on the control of certain diseases in plants, which are of great potential value to agriculture.

SECTION I

BW ACTIVITIES AFTER WWII

1. Curtailment and Reorganization of Program. (Paras. 1&2, pg 25)
 - a. Publications - The Merck Report. (Para. 3, pg 25)
 - b. Revised Postwar Program. (Paras. 4-8, pgs 25-27)
2. "Advisory Committee on BW Research and Development" (Para. 9, pg 27)
"Joint Research and Development Board" (para. 10, pg 27)
"Research and Development Board" (Para. 11, pg 27)
3. "The Stevenson Committee" - Impact (Paras. 15-17, pg 28)
4. "The Schlesle Committee" (Para. 18, pgs 28-29)
5. Dissolution of Research and Development Board (Para. 21, pg 29)
Coordinating Committee on BW & CW (Para. 21, pg 29)
6. Postwar Trends
 - a. R&D Funding 1946-1958 (pg 30)
 - b. Contracts (pgs 30-31)
 - c. Post WWII Personnel (pg 31-32)

SECTION I

BW ACTIVITIES AFTER WWII

1. The program for FY 1946 of about 200 projects was in progress when the surrender of Japan was announced on 2 Sept. 1945. For the next six months active operations in Special Projects Division were greatly curtailed. At one time serious consideration was given to completely abandoning research and development in BW. However, after much discussion, the Chief of CPS was directed to submit a peacetime Research and Development program in BW. The Vigo Plant was placed in standby. Horn Island was abandoned and the Granite Peak installation was closed and turned over to Dugway Proving Ground for surveillance.

2. During the planning for reorganization of the program, research and development personnel prepared final reports of work accomplished. Many papers were prepared for publication in scientific and technical journals, pending relaxation of security classification restrictions.

3. A summary history of wartime activity in the field of BW was presented to the Secretary of War in a Secret paper from Mr. G. W. Kerck, Special Consultant on BW in Oct. 1945. A resume of this report was the first War Department release to the Press informing the general public of the wartime story of BW by Armed Forces. Security restrictions were revised to permit publication of research papers. Between Oct. 1945 and June 1957, 121 papers were published in various journals. (As of Jan 1958 about 660 papers have been published.) Indicative of the variety of research in the program, fields covered by the papers included bacteriology, physiology, pathology, clinical medicine, preventive medicine, biochemistry, neurology, veterinary medicine, mycology, phyo-pathology, botany, public health, industrial hygiene, instrumentation, chemical engineering, chemistry, and agriculture.

4. In planning the peacetime R&D program, several projects were completed, numbers of small projects were consolidated, several projects of purely wartime military application were abandoned. Hence the 1947 project program had a total of 67 separate studies. This compact program for postwar R&D was as follows:

C1 - Screening of bacteria, viruses, fungi, protozoan, and helminth parasites for potential biological warfare agents.
Studies on arthropods as biological agent vectors.
Laboratory development of selected agents.
Development of biological defensive measures against selected agents.
Clinical studies of diseases encountered in biological warfare research.

C2 - Development of pilot plant equipment for production and processing of selected agents.
Studies on the production and processing of selected agents.

C3 - Screening, development, production, and protection against plant inhibitors and defoliants.

C4 - Development of aerosol munitions, surface-contaminating munitions, guided missiles, small arms, and covert methods.
Design of methods for filling biological warfare munitions.
Surveillance studies of munitions.
Tactical employment of munitions.

C5 - Decontamination materials and methods.

C6 - Protective clothing development.
Development of masks, canisters, and hoods.

C7 - Studies of biological warfare occupational hazards.

C8 - Nutrition of potential agents.

Cloud chamber studies.

Studies of the special physiology, pathology, and pharmacology of biological warfare diseases.

Study of chemical methods in biological warfare research.

Study of meteorological factors incident to biological warfare.

5. A difference between the wartime and postwar programs of research was the lack of emphasis in the new program on specific organisms, but concentrated effort in basic research on host-parasite relationship of groups of agents. While studies with anthrax, botulinum toxin, brucellosis, tularemia and other agents would continue, principally in an effort to improve virulence, stability and yield, more attention would be given to agents previously considered only briefly, such as those of the dysentery group, certain of the rickettsias and viruses, and diseases uncommon to different geographical areas. Emphasis in postwar research was placed on munitions development, perfection and standardization to be sought for the small bombs developed during the war. The development of new bomb types as well as warheads for guided missiles was also projected in the new program. A series of studies were to be devoted to investigating the possibility of dispersing agents by means of insects. Defensive aspects of biological warfare, from the standpoint of personnel safety as well as generally applicable medical, biological, physical, and chemical protection, would necessarily be maintained on the same high level maintained during the war.

6. In pursuing postwar research, close cooperative liaison was maintained with associated services, including the offices of the Surgeon Generals of the Army and Navy, Ordnance, appropriate General and Special Staff divisions, and the U. S. Public Health Service, U. S. Department of Agriculture, and National Institute of Health. Information and technical personnel continued to be exchanged with Great Britain and Canada on projects of special joint interest.

7. Training and indoctrination in biological warfare defense which was a part of the wartime program was continued. At the Chemical Corps' Select Army Chemical Center, (later at Ft. McClellan, Ala.) a schedule of 15 hours of biological warfare indoctrination was included in the basic regular courses for Chemical Corps officers, for selected officers of other branches of the Army, Navy, and Army Reserve officers. The first advanced course began on 2 June 1947; the first basic course on 9 July 1947. The text used in both courses was the tentative Technical Manual 3-216, Military Biology and Defense Against Biological Warfare, and other military and civilian publications.

8. During 1948 and 1949 research progressed at a fair pace; progress being made in several fields. A large scale cloud chamber was constructed at Camp Detrick. It is a welded steel sphere, 40 ft. in diameter. There are facilities for humidity, temperature, and air current control. Munitions sized up to the 4 lb bomb (M114) can be exploded in the chamber. Aerosol exposure of test animals as large as sheep and goats can be made, as well as human exposure. It provides an excellent means of study of agent penetration, munition evaluation, animal and human dosages, etc.

9. In 1945 the Chief of CWS appointed an "Advisory Committee on Research and Development" composed of representatives of General Staff, Bureau of Navy, ATSG Army, U.S.P.H.S., Bureaus of Plant and Animal Industry (USDA) and from universities. This group acted in an advisory capacity to evaluate progress in the program and to recommend changes in emphasis, additions and deletions of projects.

10. Upon formation of the "Joint Research and Development Board" under Secretary of Defense of the "National Military Establishment" in 1946, the SW Advisory Committee was transferred to the JRDB with essentially the same membership. A number of sub-panels were formed to scrutinize programs, progress, and plans in the various areas, such as antipersonnel agents, antianimal agents, crop agents, munitions, field testing and evaluation, engineering, etc. This became exceedingly confusing and cumbersome. The sub-panels reported findings to an Executive Secretary of the committee who, in turn, consolidated reports and recommendations to be considered by the committee which, in turn, made recommendations to the JRDB; its findings and recommendations were returned thru channels to the Chief of CWS as "guidance."

11. From 1949 the National Military Establishment was renamed as the Department of Defense, the JRDB was changed to the Research and Development Board, under the Secretary of Defense. The operations of the committees were essentially unchanged.

12. The onset of the Korean War caused a change in emphasis in the program. Munitions development and evaluation, along with agent production and protection studies were emphasized to achieve a better state of readiness.

Pt. Tarry was reactivated as an antianimal research center to study foot and mouth disease and rinderpest, whose viruses cannot be brought on continental U.S. soil.

13. Under a contract with Johns Hopkins University, an Operations Research Office was organized to advise the Secretary of Defense on operational feasibility of various military weapons systems. They reviewed the possibility of using BW and CW against the crops of USSR (ORO-R6-) "Preliminary Study of BW & CW Attack on Crops." Their conclusion was that the military value of such an attack was questionable.

14. The period 1947 to 1952 was an era of boards, committees, Ad Hoc groups, panels, contractors, etc. investigating, evaluating, and advising on various phases of the BW program. (At one time during a period of a few months, 23 such groups were engaged in studies and surveys.)

15. In 1950 a Secretary of Defense Ad Hoc Committee to survey the program (the Stevenson Committee) recommended that facilities for production of agents be provided, field test programs for agents and munitions be conducted, and research on defensive aspects be expanded.

16. Pursuant to recommendations of the "Stevenson Committee" the Production Development Laboratory" was built at Pine Bluff Arsenal, Ark., for production of Vegetative Agents, ABL, UL, at a cost of about \$90 million. capacity was 20,000 M33 Clusters of M114 bombs ABL fill, per month. The plant ran at operational standby and could go into full scale production in 72 hours.

17. Other results of the Stevenson Committee were increased facilities and testing schedules for BW at Dugway Proving Ground, and the augmentation of effort in Physical Defense and Biological Defense Divisions at Camp Detrick. Work by contract was materially increased during this period. The Korean War served to stimulate interest and action in BW which resulted in more liberal budgetary support; additional laboratories, pilot plants and testing facilities were built.

18. The Air Force expressed the need for a lethal agent such as anthrax or plague. Laboratory and pilot plant studies dictated that anthrax was the agent nearest to stage of full scale production. It became desirable to determine accurately the inhalation LD50 for man and to evaluate munition efficiency. To expose volunteers to anthrax aerosols was deemed too hazardous, but it was desirable to test munitions, anthrax-filled, under field conditions. An "Ad hoc Committee on BW Testing at DPG", (The Scheele Committee) was formed to examine existing data and recommend accumulation of other data and determine what, if any, and how much of various agents could be field tested at DPG within reasonable safety limits. This was composed of highly competent representatives of USDA, USPHS, DOD, and other agencies, under chairmanship of Dr. L. A. Scheele, Surgeon General, PHS. The committee decided that anthrax bombs of limited charge could be tested with safety. A test program was started to evaluate N in the

501 (mougliss) bomb - under the name "St. Jo. Program." It was determined that the agent could be aerosolized by the bomb and spread up to 40 miles downwind, in detectable quantity by good sampling techniques. Significant numbers of exposed animals were infected. These trials at Dugway Proving Ground were in accordance with the recommendations of the Stevenson Committee.

19. The munitions R&D program was placed under contract in the spring of 1953; the contractor, Ralph M. Parsons Co. used the Camp Detrick and Dugway facilities, staffing them with their own employees. The majority of technical people were Detrick personnel employed by the contractor. (The contract was effective from the spring of 1953 until terminated by the Chemical Corps in Dec. 1955 because of budget cuts.)

20. In July 1953, the AC/3 C-4 directed the Chief Chemical Officer to take steps to secure a contract with industry to operate the entire Research and Development program in BW - the contractor to use the facilities, laboratories, and buildings of the Chemical Corps as well as other facilities. Several firms expressed interest and their representatives were briefed and taken to visit facilities at Camp Detrick, Dugway Proving Ground, and Production Isolation Laboratories. The Mathieson Co. was recommended, formal negotiations began in Oct. 1953. It was expected that the contract would be signed late in Dec. However, on further consideration, officials of the company decided not to undertake the work.

21. DOD Directive 5101.1, 30 June 1953 reorganized the Office of the Secretary of Defense, appointing an Assistant Secretary of Defense (R&D) and others. It directed that functions previously carried out by the RDB would be placed under the appropriate Assistant Secretaries, and the RDB was dissolved. DOD Directive No. 5128.12, 6 Jan. 1954 delegated to the Dept. of Army, responsibility for coordination on military R&D in BW and CW. The R&D coordinating committee on BW & CW was established. It has a Technical Advisory Panel on BW and CW, the 20 members of which are authorities in their several fields. The members serve as consultants and advisors to the committee - small advisory panels are assembled to advise on special topics as need arises. The R&D Coordinating Committee on BW & CW consists of a member and deputy member designated by the Secretary of each of the three military departments, and a member and deputy designated by A/SD (R&D).

SECRETARY OF DEFENSE'S AD HOC COMMITTEE ON CBR WARFARE
(Stevenson Committee)

Members of the Committee

Mr. Earl P. Stevenson, Chairman, President, Arthur D. Little, Incorporated,
30 Memorial Drive, Cambridge, Mass.

Mr. R. Gordon Arneson, Special Assistant to the Under Secretary of State,
New State Department Building, Washington, D. C.

Dr. Willis A. Gibbons, Associate Director of Research and Development,
U. S. Rubber Co., 1230 Avenue of the Americas, New York, N.Y.

Dr. Eric G. Ball, Professor of Biological Chemistry, Harvard Medical
School, Boston, Mass.

Mr. Joseph Chase (Alternate for Mr. Arneson), Office of the Special
Assistant to the Under Secretary of State, New State Department
Building, Washington, D. C.

General Jacob L. Devers, USA (Ret.), Mills Building, 17th & Pennsylvania
Ave., Washington, D. C.

Mr. Frederick Ceborn, Formerly Deputy U. S. Representative to United
Nations Committee on Atomic Energy, Office: 230 Park Ave., New York,
N. Y.

Mr. Arthur W. Page, Formerly Vice President, American Telephone and Tele-
graph Co., Office: 46 Cedar St., New York, N.Y.

**MEMBERS OF ORIGINAL AD HOC COMMITTEE ON DPG
(Schools Committee)**

Leonard A. Schools, M.D., The Surgeon General, Public Health Service,
Dept of Health, Education & Welfare

B. T. Simms, D.V.M., Chief, Animal Disease & Parasite Research, Animal
Disease Station, USDA, Beltsville, Md. (Formerly Chief, BAI, USDA)
(Phone: 709-6430, Ext. 463)

Frank A. Todd, D.V.M., Asst. to Administrator for Emergency Health Program,
Agriculture Research Service, Washington, D. C. (Formerly Health &
Special Weapons Defense Office, PCDA, Phone: 457-4142, Ext. 2915)

George A. Spendlove, M.D., State Director of Public Health, ~~Utah State~~
Dept of Health, Salt Lake City, Utah, (Phone: Salt Lake City 21171)

Max McCall, Ph.D., 209 Waverly St, Palo Alto, California (Formerly of BSO,
Johns Hopkins, and Chief, BPI, USDA)

Colin M. MacLeod, M.D., Prof. of Microbiology, N.Y. University 100th St.
Avenue, New York 16, N.Y. (Pres. Armed Forces Epidemiological Board)

Malvin A. Gasberg, M.D., Mission Drive, Solvang, California (Formerly Asst.
Sec/Defense Health & Medicine)

William B. Barles, Ph.D., Prof. of Bacteriology, College of Agriculture,
Univ. of Wisconsin, Madison, Wis. (Phone: Madison 5-3311 Ext. 4317)

H. I. Stubblefield, M. D., Research & Development Division, Office, Chief
Chemical Officer (Recorder)

CONSULTANTS REQUESTED BY DR. SCHOLES

Peter E. Haas, M.D., Director, National Microbiological Institute,
National Institutes of Health, Bethesda 14, Maryland, Phone: OL6-4000
or Code 374, Ext. 2321

Robert E. McCallum, C.S., Chief, Office of Health Emergency Planning, Public
Health Service, Dept of Health, Education & Welfare, Washington, D. C.
Phone: 513-6300 or Code 176, Ext. 6156

POSTWAR R&D TRENDS

Period 1946-1958

The trend of postwar BW Research and Development effort is indicated by annual funding in the following table.

The beginning of the Korean War (June 1950) marked a sharp trend upward in R&D funds. The figures represent only D/A Chemical Corps R&D funds. Navy and Air Force funds allocated to the Chemical Corps for BW R&D were and are variable from year to year.

TABLE

D/A, CmlC R&D Funds
(Exclusive of other sources)

<u>FY</u>	(1000's of dollars)
1946	1,081
47	2,188
48	2,468
49	3,963
50	6,165
51	9,901
52	15,289
53	19,535
54	17,609
55	20,543
56	17,589
57	16,376
58	13,600
59	14,7 (??)

b. Contracts

Research and development projects or tasks are placed under contract with outside agencies for a variety of reasons:

- (1) Because Chemical Corps "in house" facilities or personnel are not available for release from high priority tasks to develop a process or an item.
- (2) An outside agency has facilities and personnel peculiarly qualified for some special task.
- (3) Because of Civil Service limitations on salary scale, a contractor could hire appropriate personnel not available to the Chemical Corps.

(1) Advantage of perspective viewpoint on some problem, and a fresh approach by minds not inhibited by inbred or prejudiced thinking.

(5) Implied or specific directive from higher authority to place certain tasks on contract.

(6) Implied or stated policy of higher authority that the Government avoid competition with industry.

During the past 10 or 12 years the amount of Chemical Corps R&D funds allocated to BW contracts has varied from 6% to over 50%. Individual contracts varying in dollar range from a few hundred to several million. Contracts are made with universities, research foundations, industry and other government agencies.

POST WWII PERSONNEL

The personnel peak during the war in August 1945 (see pg 15) was 3840 military (Army & Navy) and 206 civilians. This includes technical people engaged in R&D as well as some of those in housekeeping and supporting offices. A large number of the 3840 military was composed of technical people ~~who~~ ^{employed} in the Army and Navy Reserves during the war. In the postwar period ~~of~~ ⁱⁿ organization most of these returned to civilian activities, however, a ~~small~~ ^{small} remained active in the BW program for several years either as civilian employees or as consultants. A few are still with the program.

In June 1946 (ten months after VJ Day) there were 75 military and 460 civilians in the active R&D phase (this does not include housekeeping and supporting personnel).

In Feb. 1958 the breakdown of personnel at Ft. Detrick is as follows:

<u>1 Feb 1958</u>	
Graded Civilians (Including Consultants)	1201
Ungraded Civilians	904
Officers, CmC, 2d Army, Navy, & AF	62
Enlisted Scientific & Professional Personnel	222
Other Enlisted	107
TOTAL	2396

This includes supporting, administrative and housekeeping personnel as well as people in scientific positions.

At the end of WWII there were few Regular Army Chemical Corps officers and enlisted personnel with technical training in microbiology and other sciences associated with BW aside from various branches of engineering. A number of Reserve officers having advanced training in the BW area remained in the Service. During the period 1946-1948 some of these were integrated into the Regular Army. Under the career management program during the years after 1946, several Regular Army Officers were sent to civilian universities for graduate training in microbiology and associated fields. This served to augment the number of officers having professional backgrounds in BW. A considerable number of reserve officers with technical training are still in the Service, however, this group is decreased each year by retirements. It is doubtful if many remain in service after 1962. A few junior reserve officers enter extended active duty each year. Numerous officers, although not having a technical background, have gained valuable administrative experience in the several installations associated with BW research, development, or production.

Men in the Enlisted Scientific and Professional Personnel group have done excellent work in BW research and development, however, such men are rarely available for more than 18 months; when their time of service expires they return to civilian activities. Less than 3% are retained as civilian employees.

As to civilian technical and scientific personnel, during WWII many highly qualified scientists joined the program either as civilians full time or as consultants, or were commissioned in the reserve. Many of these scientists enjoyed national and a few international reputations as research workers in their respective fields. At the close of the war, many returned to civilian occupations. The number of those who remained has decreased from year to year. It appears to be increasingly difficult to secure the full time services of highly qualified specialists. Attempts have been made to attract younger scientists who have promise, but have not yet reached the peak of their potential. This has met with some success, but after being with the BW Research and Development for a year or so, they frequently go into industrial or academic fields.

A few younger men in the program at its start, have later obtained higher degrees, gained experience, made material contributions, and remained in the Chemical Corps program. These civilian personnel problems are not unique to the Chemical Corps, but exist in numerous military and non-military Federal agencies carrying out BW programs.